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Taxonomic Studies of Criconematidae (Nematoda: Tylenchida) of Japan II. Genus *Lobocriconema*

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Synopsis

Lobocriconema iyatomii n. sp. from the rhizosphere of various woody plants in Gunma, Tochigi, Mie and Nara Prefecture, is distinguished from *L. thornei* by the smaller body, the shorter stylet and absence of a distinct neck annule in the female, and three incisures (four in the latter) in the lateral field in male abult. *L. nasuense* n. sp. from *Styrax japonica* in Nishi-nasuno, Tochigi, differs from *L. hlagum* in the smooth head annule and the longer stylet. *L. orixae* n. sp. from *Orixa japonica* in Shiobara, Tochigi, differed from *L. crassiannulatum* in the two head annules and the longer stylet. The amended diagnosis and a key to the species of *Lobocriconema* were given.

Introduction

In the second part this study, three new species of the genus *Lobocriconema* DE GRISSE & LOOF, 1965 are described, which were found from rhizosphere of woody plants in Tochigi, Gunma, Mie and Nara Prefecture, Japan.

The genus *Lobocriconema* was established by DE GRISSE and LOOF (1965) for the species having coarse annules and moderately developed submedian lobes of female. Although this genus treated as a junior synonym of *Nothocriconema* DE GRISSE & LOOF, 1965 (ANDRÁSSY, 1976, 1979), or *Criconema* HOFMÄNNER & MENZEL, 1914 (RASKI and LUC, 1984), of which the type species was recently rediscovered and judged as a member of the genus formerly colled *Nothocriconema*, however, it can be considered to be an independent genus from *Criconema* (*sensu* RASKI & LUC, 1984) as being discussed in the diagnosis of the genus. Abbreviations used and methods of study employed were described in the first part of this series (MINAGAWA, 1986).

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Results and Discussion

Genus *LOBOCRICONEMA* De Grisse & Loof, 1965

Diagnosis (amended). *Female*: Body small to moderate (240-800 μm); annules coarse, retrorse; 24-73 in number, posterior margins smooth or finely crenate, surface striated in some species. Head annule(s) one or two, diameter of the first one equal to, larger or smaller than that of the second; differentiated from body annules. Lip region elevated, oral disk ovoid to rectangular, submedian lobes separated from oral disk, prominent, discoid, or semicircular to elongate oval shaped. Stylet rigid, 51-110μm long; knobs anchor shaped. Vulva open, rarely closed, located at third to 10th annule from the terminus; vulval lips small and round, the anterior one bears minute appendages, clavate, digitate or irregular in shape, on the front edge of the underside, and never overhanging the posterior one. Vagina straight or sigmoid. Tail one to seven annules, terminus round or bluntly pointed. Tail annules occasionally lobed. *Juvenile (fourth- and third-stage)*: Annules with triangular scales arranged in 10 to 25 longitudinal rows. Stylet of male juvenile present. *Do. (second stage)*: Body scales absent. Posterior edges of the annules with finely crenate. *Male*: Head round, terminus flattened. Three or four incisures in lateral field. Bursa present but reduced. Cloacal prominence small.

Type species.

L. crassiannulatum (De Guiran, 1963) De Grisse & Loof, 1965

Remarks. *Lobocriconema* includes 13 known species, which distribute Africa (7 spp.), North America (2 spp.), India (1 sp.), and Japan (present 3 new species). Male adult is scarce and only recorded with *L. thornei* (Knobloch and Bird, 1978), and *L. iyatomii* n.sp., having four or three incisures in the lateral field respectively. Juvenile stages are described with *L. incrassatum, L. thornei, L. hlagum* (Raski and Golden, 1966; Knobloch and Bird, 1978; Van den Berg, 1984) and present new species.

This genus was treated as a junior synonym of *Nothocriconema (s.l.)* (Andrássy, 1976, 1979) or *Criconema* (= *Nothocriconema (s.str.)* and allies (Raski and Luc, 1984)). The principle morphological characteristics of the genus are coarse annules, moderately developed submedian lobes, and mostly opened and occasionally closed vulva, scarcely developed vulval lips, straight or sigmoid vagina, cuticular appendixes of the underside of the anterior vulval lips, and bluntly round tail terminus. The latter genus can be distinguished from *Lobocriconema* by the following characters; closed vulva, overhanging and well developed anterior vulval lip, sigmoid vagina, absence of cuticular ornamentation on the underside of the anterior vulval lip. Based on the above mentioned differences, the genus *Lobocriconema* is considered to be an independent genus from *Criconema (sensu* Raski and Luc, 1984) as the treatments by Ebsary (1981), Van den Berg (1984) and Siddiqi (1986).

Cuticular appendages of the vulval lip are found from the three Japanese species of this genus (Figs. 26-28, 33-35). These structures were not recorded from the previously described

species, however, they are observed by SEM and also by the optical microscopes at high magnification (x1,000). Their shapes are variable even in the single species (Figs. 26-28), and then can not be employed for the distinction of the species. Key to the world species of this genus is provided as follows (*recorded in Japan).

Key to species of *Lobocriconema*:

1. Number of annules 24-25 ····· *L. pauperum* DE GRISSE, 1967
— Number of annules 31-43, mean less than 42 ····· 2
— Number of annules 42-62, mean more than 43 ····· 5
— Number of annules 67-73 ····· *L. silvum* VAN DEN BERG, 1984
2. Body length 240-450 μm, body annules smooth or crenate; head annule(s) one or two, if two the first annule equal or smaller than second ····· 3
— Body length 476-490 μm, body annules crenate or serrate, head annules two, first one distinctly larger than the second ····· 4
3. Head annule one; postvulval annules not lobed ····· *L. crassiannulatum* (DE GUIRAN, 1963) DE GRISSE & LOOF, 1965
— Head annules two; postvulval annules slightly lobed ····· *L. orixae* n. sp.*
4. V-value 87%, excretory pore at 28% of the body from anterior end ····· *L. sabiense* HEYNS, 1970
— V-value 92.4%, excretory pore at 33.3% of the body from anterior end ····· *L. brevicaudatum* (SIDDIQI, 1961) DE GRISSE, 1967
5. Stylet 90-110 μm; mean body length more than 640 μm ····· 6
— Stylet 59-97 μm; mean body length less than 550 μm ····· 7
6. Body length 647-682 μm; tail annule(s) one or two ····· *L. lefodium* VAN DEN BERG, 1984
— Body length 590-800 μm; (mean 700 μm); tail annules 2-4 ····· *L. incrassatum* (RASKI & GOLDEN, 1966) SIDDIQI, 1986
7. Vulva at 7th to 10th annule from tail end, tail annules 5-7 ····· *L. nasuense* n. sp.*
— Vulva at 5th to 7th annule from tail end, tail annules(s) 1-5 ····· 8
8. Annules distinctly serrated, surface striated ····· *L. hlagum* (VAN DEN BERG, 1979) EBSARY, 1981
— Annules smooth slightly serrated, surface not striated ····· 9
9. Body length 313-503 μm, stylet 59.3-84.9 μm ····· *L. iyatomii* n. sp.*
— Body length 480-640 μm, stylet 85-97 μm ····· 10
10. Longitudinal ridges on the annules present, posterior edges of the annules crenate ····· *L. lantanum* VAN DEN BERG, 1984
— Longitudinal ridge on the annules absent, posterior edges of the annules smooth ····· *L. thornei* KNOBLOCH & BIRD, 1978

LOBOCRICONEMA IYATOMII N. SP.

(Figs. 1-7, 14, 17-22, 26-31, 36, 39, 40, 43-50; Tables 1, 2.)

DESCRIPTIONS (mainly based on the Kusatsu population). *Female* (Figs. 1, 14, 17-22, 26-31, 36, 39, 40; Table 1). Body stout, almost straight or slightly curved ventrally after treatment by gentle heat (Figs. 1, 39, 40). Head annules two, first one convex, larger than the second, occasionally anastomosed with the following annules (Fig. 17), usually smooth, rarely crenate in outer edge (Figs. 14, 22), margined by narrow ridge, notched lateral, ventral and/or dorsal portions in some paratypes, 18.0-22.7 μm (20.7±1.8μm : mean±s.d., n=20) across; second annule smooth occasionally notched ventral portion. By SEM observation submedian lobes prominent, round, and labial disk circular (Fig. 14). Body annules coarse, and retrorse; sometimes notched in the ventral or dorsal side, especially in the anterior and posterior part, rarely throughout the body (Figs. 18, 19, 30), margins smooth or crenate in the posterior body; anastomoses occasionally present in the anterior body (Fig. 17). Stylet rigid; knobs anchor shaped. Vulva open, located at 5th to 7th annule from terminus, the anterior vulval lip round, with minute appendages on the underside of the anterior edge, and the posterior lip round and lobed. These appendages usually clavate, moderately long, separated each other, but their size and shape variable (Figs. 26-28). Ovary well developed, occasionally reaching middle of the stylet; spermatheca empty. Anus at two or three annules anterior to the tail end. Tail round conoid, terminal annules lobed in many cases (Figs. 26-31).

Male (Figs. 5-7; Table 1). Body slender and cylindrical, curved ventrally by gentle heat treatment; slightly decrease the width to round anterior end, and distinctly narrowing from the level of spicule base to the posterior terminus (Fig. 5). Body annules distinct, flattened,*ca*. 3.3-3.6 μm apart around the midbody. Head end broadly round, without annulation (Fig. 6). Esophagus obscure, slender and degenerate. Excretory pore located at the one-third of body from anterior end, excretory duct directed laterally and slightly forwardly at beginning. Testis well developed; cloacal prominence small; spicules slender and arched; gubernaculum crescent shape. Tail elongate conical, terminus short filiform. Lateral field 4.0 μm wide, with three incisures, originated from the 13th to 15th annule from the anterior end, posterior end widened as a small bursa (Fig. 7).

Fourth-stage juvenile (Figs. 2, 43, 46-49; Table 2). Body stout, with *ca*.20 triangular-scales pointed at the tip on the posterior edge of each annule (Fig. 43). Scales without spines on extremities, and roughly arranged in longitudinal rows (Fig. 47). Head annule one, crenate on the outer margin, 9.0-18.0 μm (14.6 μm: mean, n=10) in diameter (Fig. 49). Submedian lobes round, slightly prominent; labial disk rectangular or circular by SEM observation. Stylet rigid; knobs anchor shaped. Genital primordium elongated. Anus at the third to fifth annule from the tail end. Tail round conoid. Scales of tail elongated triangular and longer than those of midbody (Fig. 48).

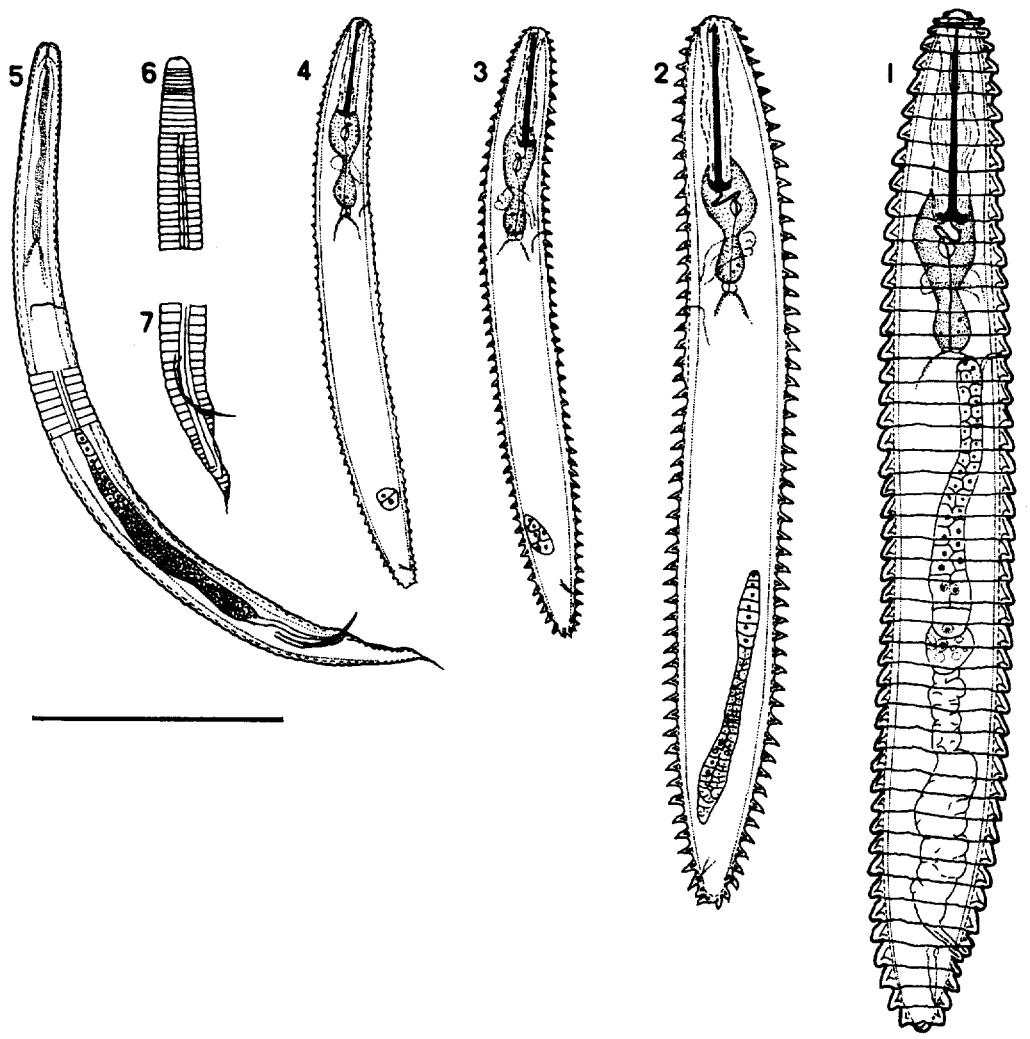

Fig. 1-7. *Lobocriconema iyatomii* n. sp. (from Kusatsu, Gunma). 1, female adult; 2,fourth-stage juvenile; 3, third-stage juvenile; 4, second-stage juvenile; 5, male adult, general view; 6, *do*., anterior body; 7, *do*., posterior body. Scale indicates 100μm.

Third-stage juvenile (Figs. 3, 44; Table 2). General shape similar to that of the fourth stage, but with the slender body, larger number of body annules, shorter stylet, and smaller body scales. Genital primordium long ovoid.

Second-stage juvenile (Figs. 4, 45, 50; Table 2). Body slender (Figs. 4, 45), without scales on the posterior edges of the annules but having fine crenations (Fig. 50). Genital primordium oval, with two cells.

TYPE SPECIMENS. Holotype (female) and paratypes (150 females, two males, and 150 juveniles) are preserved as follows. Holotype slide is deposited in the Herbarium and Insect Museum of the National Institute of Agro-Environmental Sciences (NIAES), Tsukuba, Ibaraki Prefecture, Japan. Paratypes of five females and five juveniles were distributed to the following each institute: United States Department of Agriculture Nematode Collection, Beltsville, Maryland, USA (USDANC); University of California Nematode Survey Collection, Davis, California, USA (UCNCD); Department of Nematology, Rothamsted Experimental Station, Harpenden, Herts., U.K. (DNRES); Commonwealth Institute of Parasitology, St. Albans, Herts., U. K. (CIP); Department of Nematology, Landbouwhogeschool, Wageningen, The Netherland (DNLW); Laboratoria voor Morfologie en Systematiek, Rijksuniversiteit, Gent, Belgium (LMSRUG); and Laboratoire des Vers, Muséum National d'Histoire naturelle, Paris, France (LVMNH). The remaining paratypes retained in the collection of NIAES.

TYPE LOCALITY AND TYPE HABITAT. Soil around the roots of *Prunus* sp. (*P. jamasakura*?) and *Betula platyphylla* SUKATCHEV var. *japonica* (MIQ.) HARA in Kusatsu (1240 m alt.), Gunma Prefecture, Japan by N. MINAGAWA on Oct. 28, 1981. This species also obtained from *Corylopsis pauciflora* SIEB. & ZUCC. in the Gunma Horticultural Experiment Station in Azuma-mura, Sawa-gun, Gunma Prefecture; from *Castanea crenata* SIEB. & ZUCC. in the National Grassland Research Institute, Nishi-nasuno, Tochigi Prefecture; from an unidentified woody plant in Hirakura, Misugi-mura, Mie Prefecture; and from *Prunus* sp. (*P. jamasakura*?) and unidentified woody plants in Mt. Nijo, Nara Prefecture by N. MINAGAWA and T. MIZUKUBO.

DIAGNOSIS AND RELATIONSHIPS. *Lobocriconema iyatomii* n. sp. is characterized with the moderate body length (313-503 μm); smooth or finely crenate body annules, occasionally with anastomoses, 43-57 in number; location of the vulva and anus (RV=5-7, Ran=2-4); and bluntly round tail terminus in the female abult. male adult has the slender spicule, and three incisures in the lateral field.

This new species resembles *L. thornei* KNOBLOCH & BIRD, 1978 by its larger number of the body annules in the genus, but can be distinguished from it by the smaller body (313-503 μm *vs.* 480-640 μm), shorter stylet (59.3-84.9 μm *vs.* 85-97 μm), absence of the neck annule at posterior to the first head annule, presence of anastomoses and the lateral notches of the head and body annule in the female; and the three incisures in the lateral field in stead of four in the latter (KNOBLOCH and BIRD, 1978; EBSARY, 1981).

L. iyatomii n. sp. widely distributes in the Honshu, and it is observed some intraspecific variations (Table 1). The specimens from birch in Kusatsu have lesser numbers of the body

annules (R=43-47: 46±1.3, mean±s.d., n=20) and the shorter stylet (72.6-82.5 μm : 77.9± 3.7) compared with those from *Prunus* sp. in the same locality, and the stylets of Misugi and Mt. Nijo populations are slightly shorter than those from Kusatsu, however, other respects of the morphology and dimensions are corresponded with the birch population in Kusatsu. The location of the excretory pore of the Mt. Nijo population is slightly anterior compared with those of others. The specimens from Azuma-mura have the shortest stylets and bodies, smaller stylet knobs, lesser number of body annules than those from other localities, but they are considered to be variations in *L. iyatomii*. No significant differences are observed among the populations with the face view, body annules and tail morphology by the scanning electron microscope. This species is named after the late Dr. Kisabu IYATOMI, one of the pioneer nematologists in Japan.

LOBOCRICONEMA NASUENSE N. SP.

(Figs. 8-10, 15, 23, 24, 32, 33, 35, 37, 41, 51-55; Table 3)

DESCRIPTIONS. *Female* (Figs. 8, 15, 23, 24, 32, 33, 35, 37, 41, Table 3). Body stout, curved slightly ventral after treatment by gentle heat (Figs. 8, 41). Body annules coarse, retrorse, posterior margin smooth in the anterior body, finely crenate in middle and posterior body (Fig. 37); anastomoses occasionally present. Head annule(s) one or two; first one cup like, directed forwardly, smooth or crenate in part, 16.0-22.3 μm (19.1±1.8 μm: mean±s.d., n=20) in diameter, larger than the second; second one also smooth, notched in ventral portion (Figs. 23, 24). By SEM observation, oral disk round, submedian lobes semicircular to triangular, and lateral lobes small and rectangular (Fig. 15). Stylet rigid, knobs anchor shaped. Excretory pore at around the level of esophagus end, on the same annule at hemizonid. Ovary outstretched; spermatheca round and empty. Vulva open, located at seventh to 10th annule from the posterior end; the anterior lip small, rounded, under side of the posterior edge with minute clavate appendages; and the posterior one round (Figs. 32, 33). Anus at fifth to seventh annule from the terminus. Tail conical, annules lobed or not lobed.

Male. Not found.

Fourth-stage juveniles (Figs. 9, 51, 53-55; Table 3). Body stout with rather lobed scales triangular in shape, 16-24 in number per annule arranged in almost longitudinal rows (Figs. 51, 54). Head annule one, finely crenate. Submedian lobes discoid by SEM observation (Fig. 53). Stylet rigid, knobs anchor shaped. Excretory pore on the same annule at hemizonid, and one or two annule(s) anterior to the level of the esophagus end. Genital primordium elongate oval. Scales of the tail annules longer than those of midbody. Tail elongate conical, with 4 to 8, mostly 6 or 7 annules; the terminus bluntly round (Fig. 55).

Third-stage juveniles (Figs. 10, 52; Table 3). General shape similar to the fourth-stage juvenile; but body slightly slender; body scales smaller; and genital primordium less developed, oval to elongate oval.

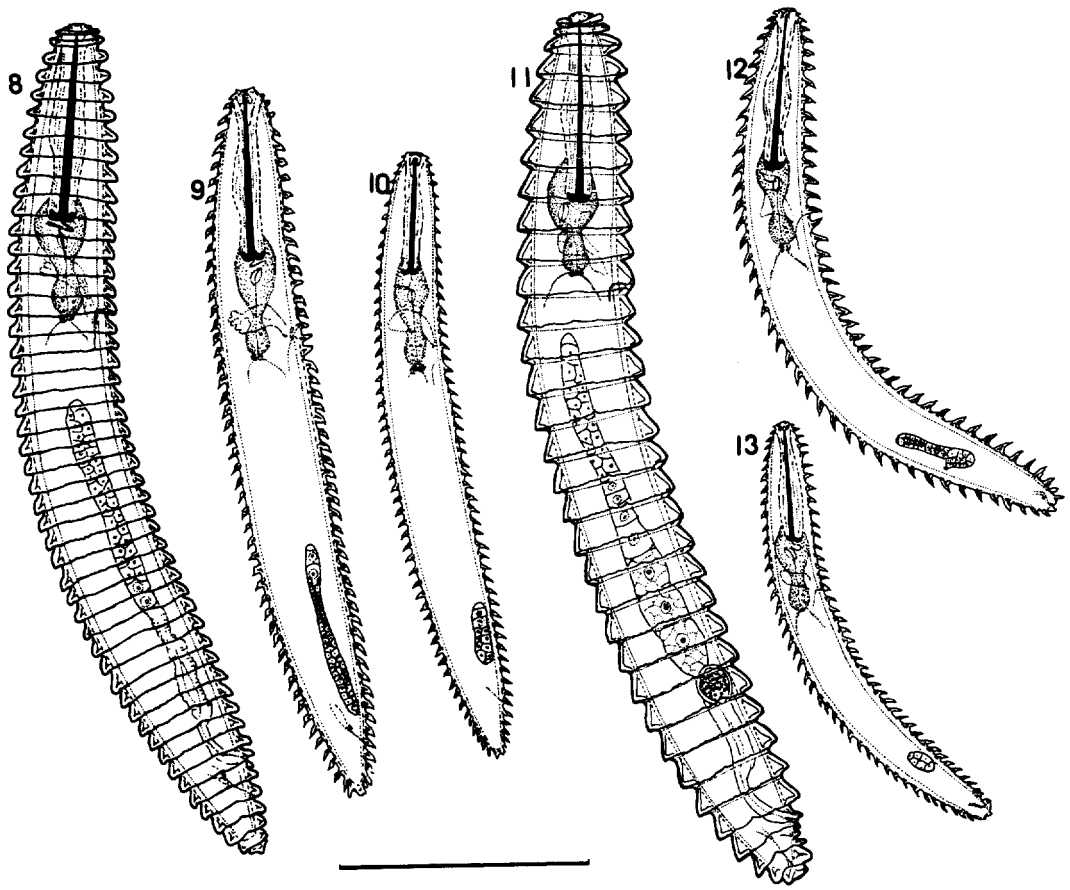

Fig. 8-13. *Lobocriconema* n. spp. 8-10: *L. nasuense* n. sp. 8, female adult; 9, fourth-stage juvenile; 10, third-stage juvenile. 11-13: *L. orixae* n. sp. 11, female adult; 12, fourth-stage juvenile; 13, third-stage juvenile. Scale indicates 100μm.

TYPE SPECIMENS. Holotype female and paratypes (38 females and 42 juveniles) collected by N. MINAGAWA in July, 1982. Holotype specimen is deposited in NIAES. Some paratypes were distributed to the following institutes: USDANC (1♀), UCNCD (3♀♀), DNRES (1♀), CIP (1♀), DNLW (1♀), LMSRUG (1♀) and LVMNH (1♀). The remaining paratypes retained in the collection of NIAES.

TYPE LOCALITY AND TYPE HABITAT. Soil around the roots of *Styrax japonica* SIEB. & ZUCC. in the National Grassland Research Institute, Nishi-nasuno, Tochigi Prefecture, Japan.

DIAGNOSIS AND RELATIONSHIPS. The unique feature of *Lobocriconema nasuense* n.sp. is the rather conical tail shape, and the anterior location of vulva and anus (RV=7-10, Ran=5-7). This new species resembles *L. iyatomii* n.sp. and *L. hlagum* VAN DEN BERG, 1979 of the larger number of body annules, but can be distinguished from the former by the more anterior location of anus (Ran=5-7 *vs*. 2-4) and vulva (RV=7-10 *vs*. 5-7); and from the latter (VAN DEN BERG, 1979, 1984) by the smooth and anteriorly directed frist head annule and the longer stylet (59.3-84.9 μm *vs*. 58.5-65.5 μm).

LOBOCRICONEMA ORIXAE N. SP.

(Figs. 11-13, 16, 25, 34, 38, 42; Table 4)

DESCRIPTIONS. *Female* (Figs. 11, 16, 25, 34, 38, 42; Table 4). Body stout, curved ventrally after treatment by gentle heat (Figs. 11, 42). Head annules two, the first annule smooth or crenate in part; notched in dorsal and ventral portion, and occasionally in lateral; and 18.7-22.0 μm (20.1±1.1 μm: mean±s.d., n=20) in diameter (Fig. 25). The second head annule smooth; almost equal diameter to the first. By SEM observation, oral disk round to circular, submedian lobes semicircular, and lateral lobes small and round (Fig. 16). Body annules coarse and retrorse, smooth or finely crenate in the posterior margin of the middle and posterior body, slightly notched in the lateral portion throughout the body (Fig. 38). Stylet rigid, knobs anchor shaped. Ovary outstretched, or reflexed once or twice. Spermatheca spherical filled with round spermatozoa. Vulva open, mostly at the fifth annule from the terminus. Anterior vulval lip round with clavate minute appendages on its underside of the posterior edge; the posterior lip also round (Fig. 34). Posterior margin of the postvulval annules slightly lobed. Anus at the terminal annule of the body. Tail extremity round (Fig. 34).

Male. Not found, although female spermatheca was filled with spermatozoa.

Fourth-stage juveniles (Fig. 12; Table 4). Body cylindrical, with 12-14 longitudinal scale rows. Body scales triangular, pointed at the tip, and rather lobed like those of *L. nasuense*(Figs. 53-55). Head with one or two annules; first annule crenate, 8.0-11.3 μm (9.4 μm: mean, n=3) in diameter, smaller than the second and/or the first body annule. Stylet rigid, knobs anchor shape. Genital primordium elongated. Anus at the terminal or the second annule from the tail end.

Third-stage juveniles (Fig. 13; Table 4). General shape similar to fourth stage, but body

scales smaller, and genital primordium oval. Longitudinal rows of body scales 12 or 13.

TYPE SPECIMENS. Holotype (female) and paratypes (33 females and 9 juveniles) collected by N. MINAGAWA in July, 1982. Holotype slide is deposited in NIAES. Some paratypes were distributed to the following institutes; USDANC (3♀♀), UCNCD (2♀♀), DNRES (1♀), CIP(1♀), DNLW (1♀), LMSRUG (1♀), and LVMNH (3♀♀). The remaining paratypes retained in the collection of NIAES.

TYPE LOCALITY AND TYPE HABITAT. Soil around the roots of *Orixa japonica* THUNBERG in Hikinuma (400 m alt.), Shiobara, Tochigi Prefecture, Japan.

DIAGNOSIS AND RELATIONSHIPS. The most significant characteristics of *Lobocriconema orixae* n.sp. are the coarse body annules (R=34-38), two head annules of equal diameter, location of anus at the posterior extremities of the tail, and slightly lobed postvulval annules.

The present new species is most closely related to *L. crassiannulatum* (DE GUIRAN, 1963) (DE GUIRAN, 1963; DE GRISSE, 1963, 1965) by the body length, number of the body annules and stylet length, but differs from it in the presence of two head annules and the lobed postvulvar annules in the present new species, whereas one head annule and unlobed postvulvar annules in the latter.

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Table 1. Measurements and dimensions of female and male adult of *Lobocriconema iyatomii* n. sp.

	Female						Male
	Holotype	Paratypes					Paratype
	Kusatsu Gunma Pref.	Kusatsu Gunma Pref.	Azuma-mura Gunma Pref.	Nishi-nasuno Tochigi Pref.	Misugi Mie Pref.	Mt. Nijo Nara Pref.	Kusatsu Gunma Pref.
n		20	20	10	10	10	2
L (μm)	412	373—467 (413±24)	313—465 (356±36)	373—445 (401)	361—465 (402)	333—503 (429)	320—340
a	10.0	8.7—12.2 (10.2±1.0)	9.8—12.0 (10.7±0.6)	9.9—11.4 (10.7)	8.5—12.1 (9.9)	7.7—14.2 (10.8)	15.5—17
a′	8.4	7.4—9.7 (8.4±0.7)	8.1—10.0 (8.8±0.5)	8.5—9.2(8.8)	7.3—9.7 (8.3)	6.6—11.4 (9.0)	
b	3.0	2.8—3.4 (3.1±0.1)	2.9—4.1 (3.3±0.3)	2.9—3.5 (3.2)	2.9—3.5(3.2)	3.3—4.6 (4.0)	4.0—4.6
c	29.4	19.1—51.9 (37.0±8.2)	33.0—65.9 (47.6±9.4)	21.0—33.7 (26.0)	22.8—39.1 (30.8)	22.7—61.0 (36.2)	8.0—8.7
V	90.9	89.7—92.7 (91.4±0.8)	91.7—94.9 (93.5±0.7)	91.7—93.2 (92.7)	92.1—93.3 (92.9)	90.6—94.8 (92.4)	
R	50	47—53 (49.7±1.4)	43—49 (45.5±1.7)	47—54 (50.8)	47—57 (51.8)	47—54 (50.8)	103—108
RV	6	5—7(6.0±0.6)	5—7 (5.5±0.6)	5—6 (5.7)	5—7 (6.0)	5—7 (6.0)	
Ran	3	2—3 (2.7±0.3)	2—4 (2.7±0.6)	3—4 (3.2)	2—4 (3.0)	2—4 (2.8)	13—15
RVan	2	2—3 (2.3±0.6)	1—2 (1.9±0.3)	1—2 (1.5)	1—3 (2.0)	2—3 (2.2)	
Rex	18	15—18 (16.7±0.8)	14—16 (14.6±0.8)	16—18 (17.1)	16—18 (17.3)	15—18 (16.3)	36—40
RSt	11	10—12 (11.0±0.6)	9—11 (9.9±0.6)	9—12 (10.4)	11—12 (11.2)	9—12 (10.3)	
ROes	17	14—18 (16.3±1.0)	12—16 (14.7±1.1)	14—19 (16.1)	16—19 (17.2)	12—17 (14.1)	31—33
Stylet (μm)	80.0	77.5—84.9 (81.5±1.9)	59.3—76.7 (66.8±4.4)	74.2—83.3 (76.8)	69.3—79.2 (75.5)	61.0—77.5 (69.5)	
Prorhabdion (μm)	58.7	57.5—62.7 (60.0±1.6)	43.3—56.7 (49.6±4.1)	56.1—62.7 (58.0)	54.4—61.0 (57.6)	44.5—59.4 (52.0)	
St. K. H. (μm)	4.7	4.0—4.7 (4.3±0.3)	2.7—4.3 (3.6±0.4)	4.1—4.9 (4.8)	4.1—5.8 (4.8)	4.1—5.7 (4.7)	
St. K. W. (μm)	12.0	11.0—13.0 (12.0±0.6)	7.3—10.3 (8.9±0.7)	10.8—13.2 (11.5)	10.7—12.3 (11.5)	9.9—11.5 (10.7)	
Ex. Pore/L (%)	34.6	28.3—35.3 (32.8±1.6)	27.0—34.0(30.0±1.6)	29.8—36.0 (33.3)	29.2—33.2 (31.2)	26.6—31.7 (28.7)	
T (%)							40.4—40.8
c′							2.6—3.1
Spicule (μm)							38.0—38.7
Gubernaculum (μm)							7.3

Figures indicate minimum and maximum values, and mean or mean±s. d. in parentheses.

Table 2. Measurements and dimensions of juvenile stages of *Lobocriconema iyatomii* n. sp. (Kusatsu population, paratypes)

	Fourth stage	Third stage	Second stage
n	10	10	10
L (μm)	320—360 (338)	237—267 (254)	190—224 (205)
a	8.4—10.5 (9.6)	9.2—11.3 (10.1)	10.5—12.9 (11.1)
a'	6.8—8.5 (7.8)	7.5—9.1 (8.2)	9.3—10.6 (9.7)
b	2.8—3.8 (3.1)	2.7—3.1 (2.9)	2.6—3.0 (2.9)
c	17.1—24.0 (20.4)	13.2—21.9 (15.8)	12.2—17.0 (14.9)
R	51—55 (53.1)	54—58 (55.5)	57—63 (61.6)
Ran	3—5 (4.1)	4—6 (5.1)	5—7 (5.8)
Rex	17—19 (18.3)	19—21 (19.8)	20—25 (22.8)
RSt	10—12 (11.1)	11—14 (12.2)	12—15 (13.3)
ROes	16—19 (17.5)	18—21 (19.9)	21—24 (22.8)
Stylet (μm)	60.3—68.0 (64.5)	45.3—53.3 (49.1)	32.3—38.0 (35.1)
Prorhabdion (μm)	44.0—52.0 (47.7)	33.3—39.3 (36.2)	22.7—27.3 (25.0)
St. K. H. (μm)	3.3—4.0 (3.6)	2.7—3.3 (3.0)	2.0—3.0 (2.4)
St. K. W. (μm)	8.7—9.3 (8.9)	6.7—7.3 (6.9)	4.7—6.0 (5.4)
Ex. pore/L (%)	32.4—36.0 (34.1)	32.7—37.9 (35.0)	33.3—37.1 (35.2)
Gen. Prim. (μm)	50.0—106.7 (83.7)	10.7—20.0 (16.4)	6.3—9.3 (7.8)
Scale rows	18—22 (19.4)	16—24 (21.1)	

Figures indicate minimum and maximum values, and mean in parentheses.

Table 3. Measurements and dimensions of *Lobocriconema nasuense* n. sp.

Stages	Holotype	Paratypes		
	Female	Female	Juveniles	
			Fourth stage	Third stage
n		20	10	10
L (μm)	359	313—430 (368±28)	273—295 (281)	187—245 (223)
a	8.0	6.4—9.2 (8.0±0.7)	7.4—8.7 (8.2)	7.3—9.4 (7.9)
a′	10.4	8.0—11.8 (9.7±1.0)	8.9—10.8 (9.9)	8.7—11.2 (9.7)
b	3.2	2.9—3.4 (3.2±0.1)	2.5—2.8 (2.7)	2.2—2.9 (2.6)
c	15.8	11.3—19.9 (15.2±2.4)	10.1—14.5 (12.6)	10.7—16.5 (13.3)
V	87.9	85.6—91.3 (88.7±1.4)		
R	50	49—53 (51.3±1.0)	50—55 (52.8)	53—56 (55.4)
RV	9	7—10 (8.4±0.8)		
Ran	6	5—7 (5.6±0.6)	4—8 (6.4)	6—8 (6.3)
RVan	2	1—3 (1.7±0.6)		
Rex	15	15—17 (15.9±0.6)	15—18 (16.9)	18—20 (18.7)
RSt	10	9—12 (10.6±0.8)	10—12 (11.3)	11—14 (12.4)
ROes	15	14—17 (15.8±0.7)	17—20 (18.6)	18—20 (18.7)
Stylet (μm)	71.3	69.3—78.0 (73.8±2.6)	56.7—65.3 (60.7)	45.3—51.3 (47.6)
Prorhabdion (μm)	53.3	52.7—59.3 (56.2±1.8)	42.7—50.0 (45.2)	33.3—38.7 (35.2)
St. K. H. (μm)	4.0	3.7—5.0 (4.4±0.5)	3.3—4.3 (3.8)	2.7—4.0 (3.3)
St. K. W. (μm)	10.0	9.0—11.3 (10.1±0.5)	8.0—9.3 (8.8)	6.3—7.3 (6.8)
Ex. Pore/L (%)	29.7	30.5—33.3 (31.9±0.8)	31.7—35.6 (33.3)	32.9—37.1 (35.0)
Gen. Prim. (μm)			54.0—71.3 (66.2)	8.0—28.0 (19.4)
Scale rows			16—24 (20.5)	18—25 (21.0)

Figures indicate minimum and maximum values, and mean or mean±s. d. in parentheses.

Table 4. Measurements and dimensions of *Lobocriconema orixae* n. sp.

Stages	Holotype	Paratypes		
	Female	Female	Juveniles	
			Fourth stage	Third stage
n		20	3	6
L (μm)	406	306—429 (375±35)	233—254 (243)	177—247 (211)
a	8.4	6.4—9.1 (7.9±0.7)	7.5—10.2 (8.9)	6.7—9.8 (7.9)
a′	10.5	7.8—12.9 (10.2±1.2)	9.7—12.7 (9.9)	8.0—11.3 (10.2)
b	3.7	2.8—3.8 (3.4±0.2)	2.7—3.1 (2.9)	2.4—3.7 (2.9)
c	60.5	45.3—123.6 (81.0±19.9)	—	19.7—74.8 (55.5)
V	94.4	92.7—96.2 (94.2±1.1)		
R	36	34—38 (35.9±1.1)	42—50 (47.0)	43—49 (46.3)
RV	5	4—6 (4.7±0.6)		
Ran	1	1	1—2 (1.3)	1—2 (1.8)
RVan	3	2—5 (2.8±0.7)		
Rex	13	12—14 (12.5±0.6)	15—17 (16.0)	10—12 (11.2)
RSt	8	8—12 (8.8±1.0)	11—12 (11.7)	14—19 (16.8)
ROes	11	10—15 (11.7±1.2)	16—19 (17.3)	17—18 (17.3)
Stylet (μm)	75.3	69.3—85.0 (75.4±4.4)	53.3—61.3 (56.6)	43.3—47.0 (45.4)
Prorhabdion (μm)	58.7	50.0—62.7 (57.9±3.1)	39.3—47.3 (42.4)	32.3—35.3 (33.8)
St. K. H. (μm)	3.7	3.3—4.0 (3.8±0.2)	2.0—3.3 (2.4)	2.0—2.7 (2.4)
St. K. W. (μm)	10.0	8.7—10.7 (9.7±0.5)	6.7—8.0 (7.1)	5.7—6.7 (6.1)
Ex. Pore/L (%)	33.5	29.0—39.0 (33.4±2.1)	32.9—34.1 (33.3)	35.9—37:6 (37.1)
Gen. Prim.			60.0—68.0 (63.8)	11.3—16.7 (13.8)
Scale rows			12—14 (13.3)	12—13 (12.7)

Figures indicate minimum and maximum values and mean or mean±s. d. in parentheses.

日本産ワセンチュウ科の分類学的研究　II. *Lobocriconema*属

皆川　望*

摘　要

本シリーズ第2報として，*Lobocriconema*属線虫の3新種を記載した。本属はANDRASSY (1976) により*Nothocriconema*属の異名とされ，LUC & RASKI (1984) においては*Criconema*属（従来の*Nothocriconema*属及び近縁の属からなる）に含まれるとされた。しかし，EBSARY (1981)，VAN DEN BERG (1984)，SIDDIQI (1986) は独立の属として扱っている。本稿では*Lobocriconema*属と広義の*Criconema*属は別属として取り扱った。その理由として，本属は*Criconema*属と比較して，submedian lobeが比較的発達している・多くの種において陰唇は小さく膣開口部を覆わない・陰唇の下部にクチクラの微小突起が存在する・膣が真直でS字状をなさない等の特徴をあげた。また，本属の定義を一部改定し，今回記載された種を含め，世界各地から記載された13種の検索表を示した。

群馬県草津町のサクラ類およびシラカバ，同県佐波郡東村のヒュウガミズキ，栃木県西那須野町のクリ，三重県美杉村の木本(未同定)，奈良県二上山のサクラ類および未同定の木本から検出した種は，*L. iyatomii*（新種）と命名し記載した。本種は体長313-503μm，体環数は43-57，口針長59.3-84.9μm，体環の表面は滑らかで線刻を欠き，陰門は体の後端から5-7体環目，肛門は2-4体環目に位置する等の特徴を有する。最も近似する種は，体環数が多いことから，北アメリカから記載された*L. thornei* KNOBLOCH & BIRD, 1978と考えられるが，それと比較して体長が短く（後者は480-640μm），口針長も小さく（同85-97μm），明瞭な頸部体環を欠く等の形態的特徴により区別できる。また，群馬県東村の個体群において1個体のみ検出した雄成虫は，側線は3本(後者は4本)である点においても，両種は異なる。

栃木県西那須野町のエゴノキ根辺土壌から採取した種は，*L. nasuense*（新種）と命名した。本種の一番の特徴は，体の後端部がやや尖る点である。また体長313-430μm，体環数49-53，口針長69.3-78.0μm，陰門は体の後端から7-10体環目，肛門は5-7体環目に位置する等の特徴を有する。この種と比較的形態が似た種類として，*L. iyatomii*が挙げられる。しかし本種はそれとは，陰門・肛門ともにより体の前方に位置する点で区別できる。また，*L. hlagum* VAN DEN BERG, 1979とも似るが，体環表面に線刻を欠き，口針が長い等の区別点が認められた。

栃木県塩原町のコクサギ根辺土壌から分離した種は，*L. orixae*（新種）と命名した。本種は体環数34-38，体長306-429μm，口針長69.3-85.0μm，頭部はほぼ同じ大きさの2体環を持ち，陰門は体の後端から4-6体環目，肛門は尾端体環に位置する等の特徴を有する。これはCorte d'Ivoreから記載された*L. crassiannulatum* (DE GUIRAN, 1963) に計測値等で似るが，後者では頭部体環が2個ではなく1個であること，また後者は尾部体環の後縁が後方に延びないのに対し，本種では延びる等の差異があった。

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Legends for figures

(p. 122 ; figs. 14-16:x1,800; figs. 17-25: x1,200)

Fig. 14. *L. iyatomii* n. sp. (from Kusatsu, Gunma), female, face view.

Fig. 15. *L. nasuense* n. sp., female, face view.

Fig. 16. *L. orixae* n. sp., female, face view.

Fig. 17, 18. *L. iyatomii* n. sp. (from Kusatsu, Gunma), female, head, latero-dorsal (17) and latero-ventral view (18).

Fig. 19-22. *L. iyatomii* n. sp. (from Azuma-mura, Gunma), female, head, ventral (19), latero-dorsal (20, 21) and lateral view (22).

Fig. 23, 24. *L. nasuense* n. sp., female, head, latero-ventral (23) and ventral view (24).

Fig. 25. *L. orixae* n. sp., female, head, dorsal view.

(p. 123; figs. 26-34: x1,200; fig. 35: x3,000; figs. 36-38: x600)

Fig. 26. *L. iyatomii* n. sp. (from Kusatsu, Gunma), female, tail, ventral view.

Fig. 27, 28. *L. iyatomii* n. sp. (from Azuma-mura, Gunma), female, tail, ventral view.

Fig. 29. *L. iyatomii* n. sp. (from Kusatsu, Gunma), female, tail, lateral view.

Fig. 30, 31. *L. iyatomii* n. sp. (from Azuma-mura, Gunma), female, tail, lateral view.

Fig. 32, 33. *L. nasuense* n. sp., female, tail, latero-ventral (32) and ventral view (33).

Fig. 34. *L. orixae* n. sp., female, tail, latero-ventral view.

Fig. 35. *L. nasuense* n. sp., female, vulval lips.

Fig. 36. *L. iyatomii* n. sp., female, midbody, lateral view.

Fig. 37. *L. nasuense* n. sp., female, midbody, latero-ventral view.

Fig. 38. *L. orixae* n. sp., female midbody, lateral view.

(p. 124 ; figs. 39-45, 51-52: x180; figs. 46-50, 53-55: x1,200)

Fig. 39. *L. iyatomii* n. sp. (from Kusatsu, Gunma), female, general shape, latero-ventral view.

Fig. 40. *L. iyatomii* n. sp. (from Azuma-mura, Gunma), female, general shape, lateral view.

Fig. 41. *L. nasuense* n. sp., female, general shape, latero-ventral view.

Fig. 42. *L. orixae* n. sp., female, general shape, lateral view.

Fig. 43. *L. iyatomii* n. sp. (from Kusatsu, Gunma), fourth-stage juvenile, general shape, lateral view.

Fig. 44. *L. iyatomii* n. sp. (from Kusatsu, Gunma), third-stage juvenile, general shape, latral view.

Fig. 45. *L. iyatomii* n. sp. (from Azuma-mura, Gunma), second-stage juvenile, general shape, lateral view.

Fig. 46. *L. iyatomii* n. sp. (from Kusatsu, Gunma), fourth-stage juvenile, head, lateral view.

Fig. 47. *L. iyatomii* n. sp. (from Kusatsu, Gunma), fourth-stage juvenile, midbody, lateral view.

Fig. 48. *L. iyatomii* n. sp. (from Kusatsu, Gunma), fourth-stage juvenile, tail, lateral view.

Fig. 49. *L. iyatomii* n. sp. (from Kusatsu, Gunma), fourth-stage juvenile, face view.

Fig. 50. *L. iyatomii* n. sp. (from Azuma-mura, Gunma), second-stage juvenile, head, lateral view.

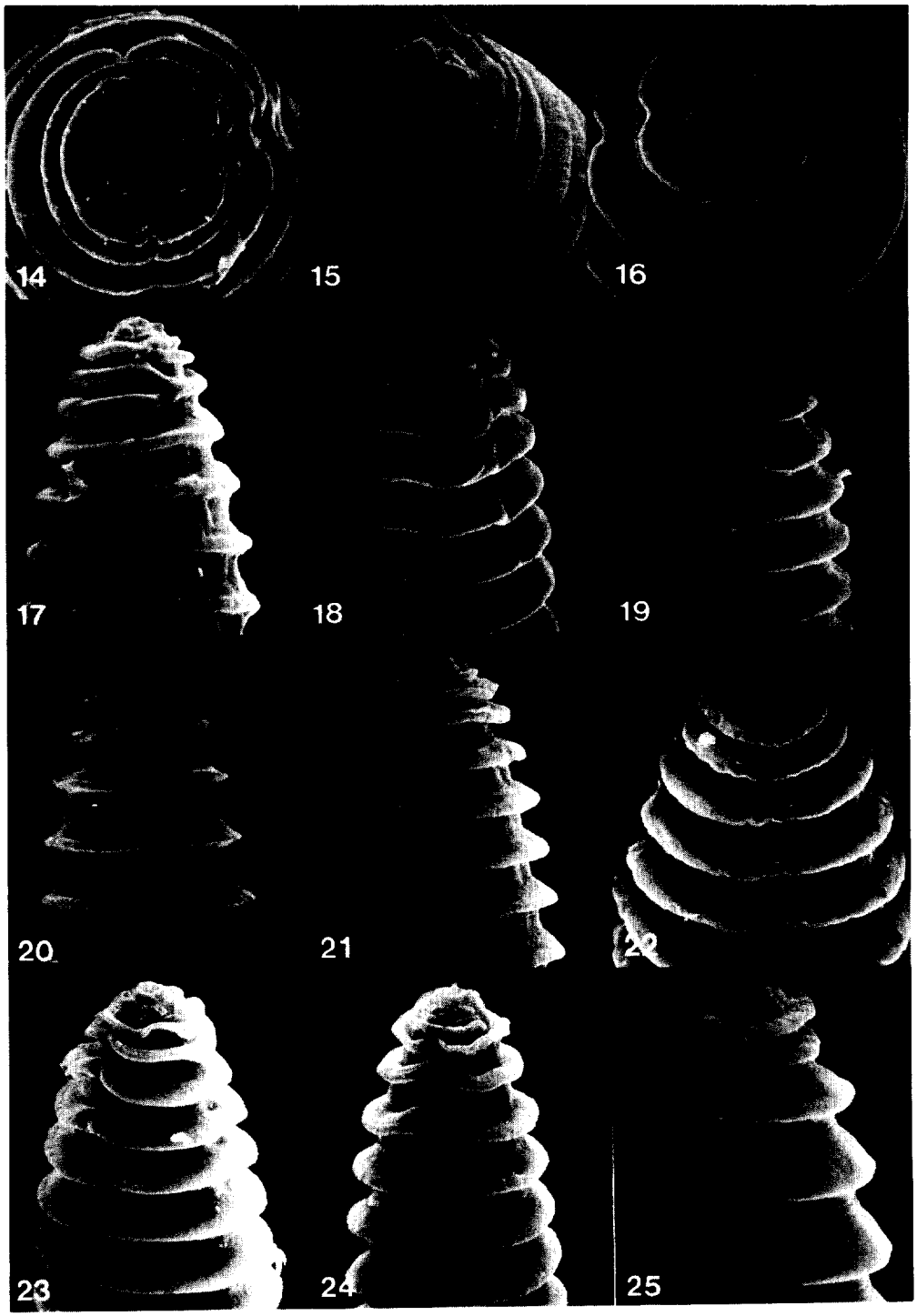
Fig. 51. *L. nasuense* n. sp., fourth-stage juvenile, general shape, lateral view.

Fig. 52. *L. nasuense* n. sp., third-stage juvenile, general shape, lateral view.

Fig. 53. *L. nasuense* n. sp., fourth-stage juvenile, head, lateral view.

Fig. 54. *L. nasuense* n. sp., fourth-stage juvenile, midbody, lateral view.

Fig. 55. *L. nasuense* n. sp., fourth-stage juvenile, tail, lateral view.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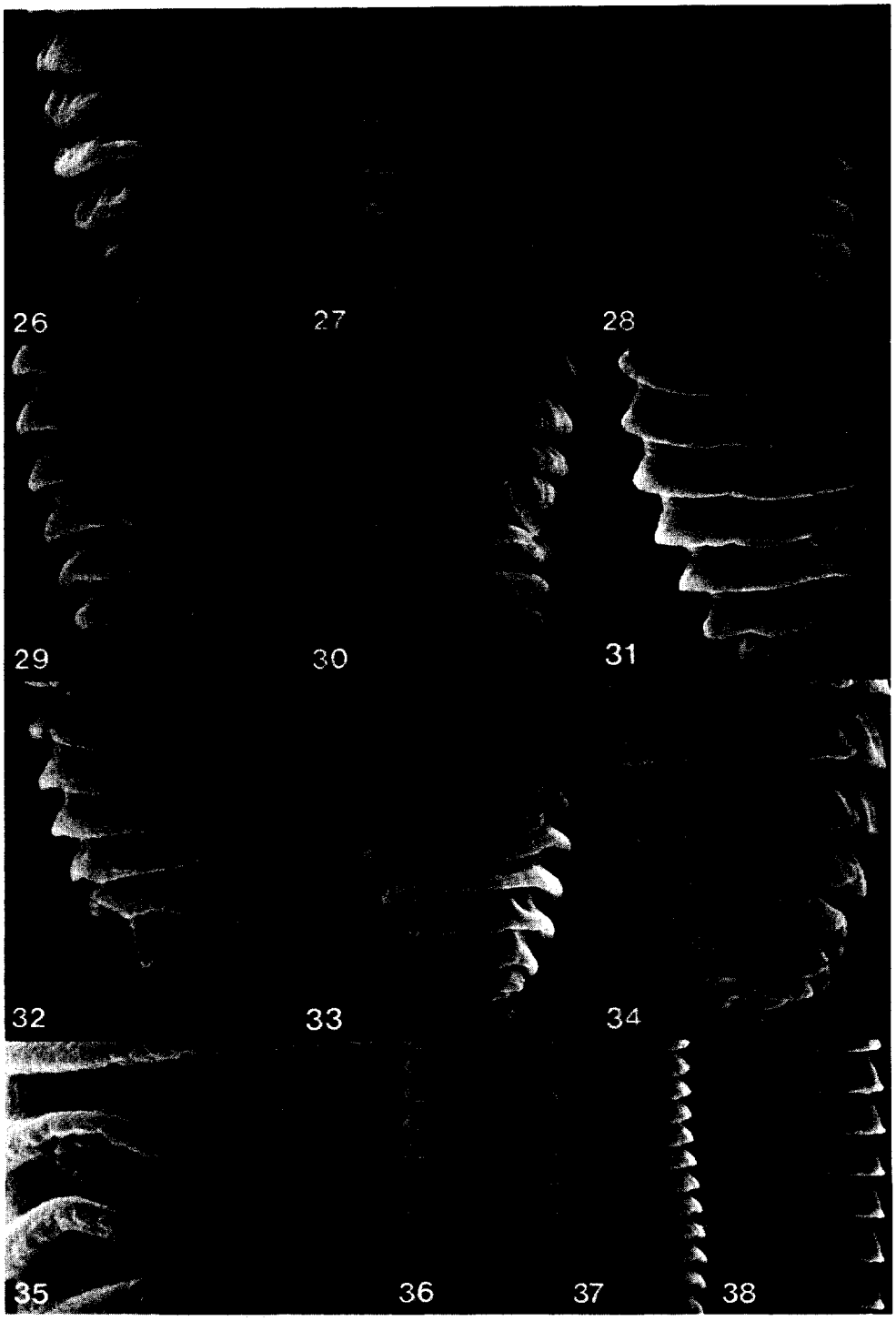
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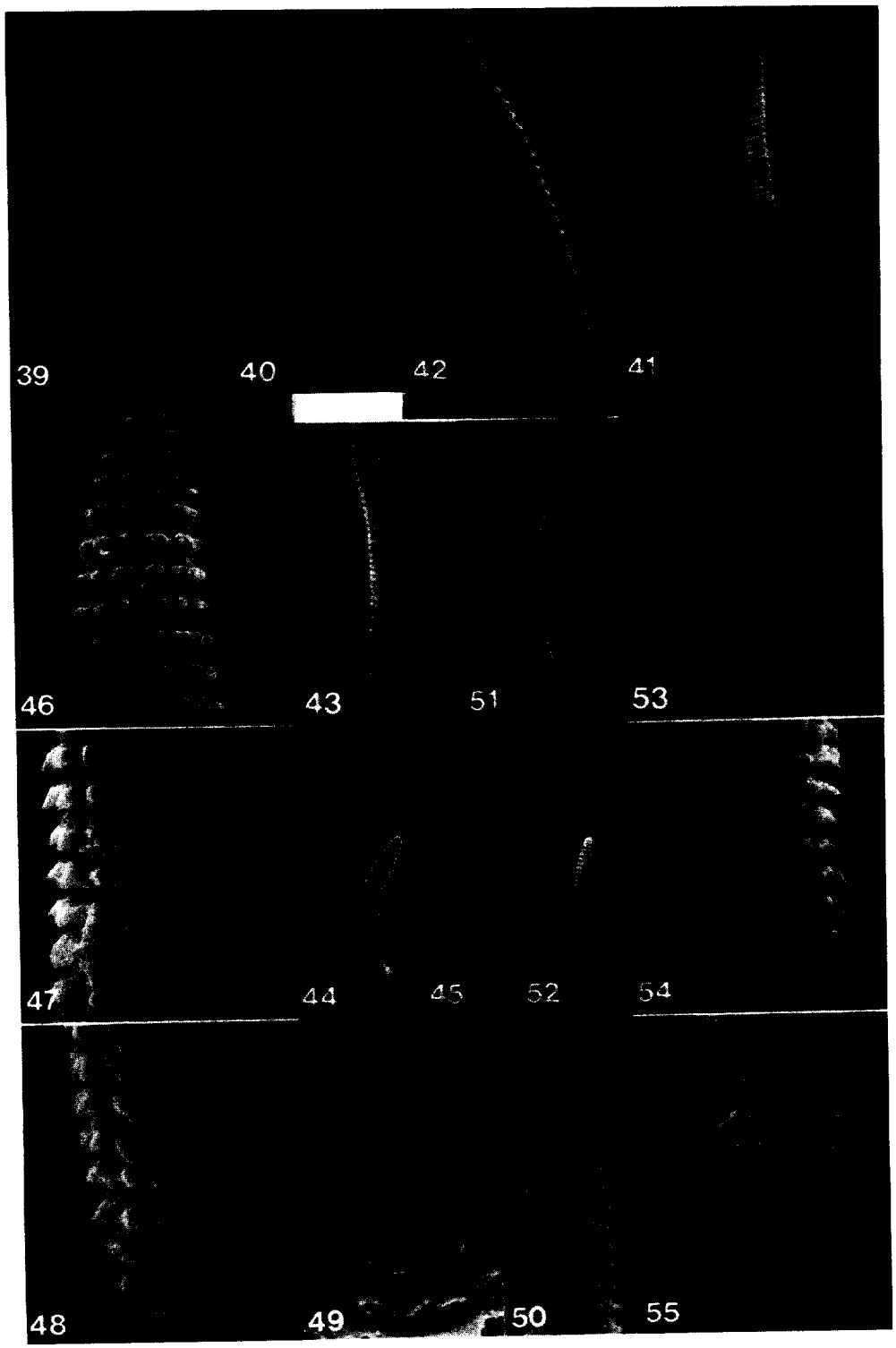
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